

## Fetal Echocardiography performance: Indication-based vs "routine" application



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**Introduction.** Established indications (EI) for performing fetal echocardiography (fEcho) are based on documented increased risk for fetal congenital heart disease (fCHD) in the presence of specific indications, over the literature based baseline fCHD risk in the general population

### Methods

- Direct comparison of **risk for fCHD** (overall and indication specific) **relative to the baseline risk for fCHD** when fEcho is performed for non-established indications (NEI).
- **Retrospective study of 2,202 fECHO records** (years 2008-16) from a tertiary referral Centre, all performed by a single operator under same settings.
- **Referral indications were classified as**
- **established (EI)** based on recent recommendations (AHA 2014), or
- **non-established (NEI)**, including: parental wish, "echogenic foci", previous fetus with chromosomal abnormality, NT <3.5mm, medications without association with fCHD, maternal heart disease (non-CHD), relatives (non-first degree) with CHD, reduced window in anomaly scan, increased PAPP-A.
- Odds ratio (O.R, 95% C.I) for fCHD and critical fCHD (anticipated to require neonatal intervention) were estimated in the presence/absence of EI for fECHO, along with Relative Risk (R.R)

### Results

#### A. Fetal CHD.

367 out of 1147 (32%) of EI cases were associated with fCHD, vs 180 out of 1055 (17%) of NEI cases

- O.R for fCHD presence (yes/no): 2.28 (1.86-2.80),
- R.R for fCHD for EI: 1.42 (1.31-1.53),  
for NEI: 0.62 (0.54-0.7) **Fig.1**

#### B. Critical Fetal CHD.

19 (1.7%) of EI cases were associated with critical fCHD, compared to 6 (0.6%) of NEI cases (p=0.016),

- O.R for critical fCHD presence (yes/no): 2.94 (1.17-7.4),
- R.R for critical fCHD for EI: 2.91 (1.16-7.2),  
for NEI: 0.98 (0.98-0.99) **Fig. 2**

#### C. Established Indications vs non-Established

EI referrals were associated with increased risk (compared to NEI) for:

- 1) **f.CHD** 32% vs 17%, **O.R: 2.28**, (1.86-2.8)
- 2) **critical f.CHD** 1.7% vs 0.6%, **O.R: 2.94**, (1.17-7.4)  
(Chi-square p<0.01)

#### D Indication specific risk in EI cases

**A. the risk for fCHD** (in decreasing order) was:

- **50-60%** in suspected fCHD in anomaly scan, polyhydramnion, and fetal chromosomal abnormalities,
- **30-50%** in increased NT, fetal malformations,
- **20-30%** in 1st degree relatives with CHD, monozygotic twins. **Fig.3**

**B. the risk for critical fCHD** was highest for

- suspected fCHD during anomaly scan (5%),
- increased NT and fetal malformation (1.5-2%).

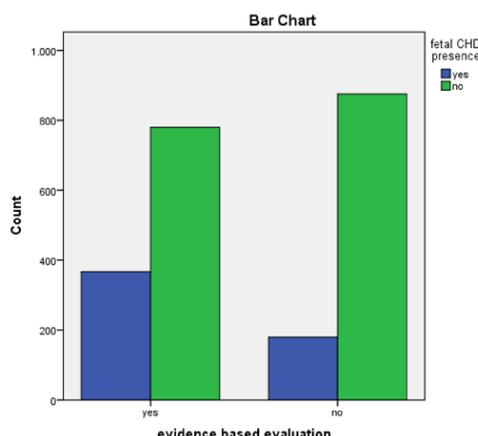


Fig.1 Fetal CHD

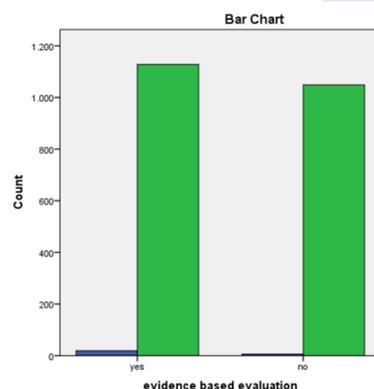


Fig.2 Critical Fetal CHD

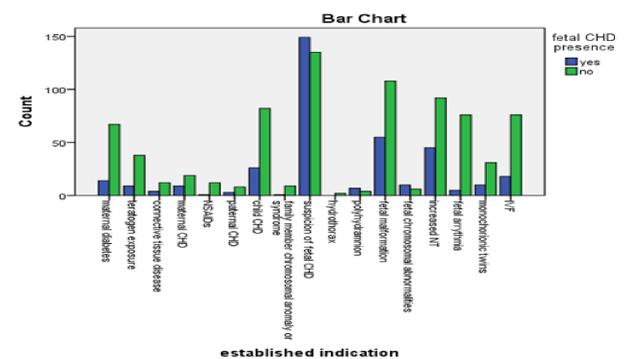


Fig.3 Fetal CHD - specific EI for fECHO

### Conclusions

**Indication-based fetal echocardiography is associated with 2-fold and 3-fold increased diagnostic yield for fetal CHD and critical fetal CHD, respectively, compared to its performance when applied "routinely" for non-established indications**